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THE PLANT DISEASE REPORTER

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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XX January 15, 1936 Number 1

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NOTES ON FRUIT DISEASES IN THE OZARK SECTION OF MISSOURI AND ARKANSAS IN 1935

M. A. Smith and John C. Dunegan

In contrast to the prolonged drought and high temperatures experienced in 1934, the 1935 season was marked by a superabundance of moisture and relatively cool weather until mid-summer. The following notes on the various fruit diseases observed in 1935 in the Ozark section of Missouri and Arkansas illustrate how readily diseases which were of little or no commercial importance in 1934 became limiting factors in commercial fruit production under the extremely favorable environmental conditions of 1935.

Apple Scab (Venturia inaequalis): The very severe outbreak of this disease was the outstanding pathological problem of the season.

It might be assumed, as unfortunately many commercial growers did, that the ascosporic inoculum overwintering from 1934 would be very meager following the prolonged drought of the summer of 1934. It is true that the scab lesions were almost non-existent on the leaves and fruit in the early part of the 1934 growing season but the abundant rainfall in late August and early September which ended the drought made conditions favorable for a very general infection of scab on the foliage late in the season.

This fall infection of the foliage by the scab fungus is not an uncommon occurrence in the Ozarks. Records to date show that infection occurred in the fall of the years 1931, 1932, and 1933. It has been further observed that there is a normal development of the ascigerous stage in the fall-infected foliage and that perithecial maturation is rapid enough in this material to result in an abundance of ascosporic inoculum the following spring. Observations in the late winter and early spring of 1935 showed the presence of large numbers of perithecia in overwintered leaves. In some of the perithecia 50 per cent of the ascospores were mature by March 10, 1935.

Weather conditions in Missouri during April and May were ideal for the initiation of primary infection and subsequent rapid development of the disease. A total of 2.70 inches of rain fell during April. Temperatures were slightly below the normal for the month. In the month of May there was a total rainfall of 7 inches with subnormal temperatures throughout most of the month. Very similar conditions prevailed in Arkansas with a total of 2.95 inches of rain in April and 8.64 inches in May recorded in Fayetteville. The temperatures for both months were below the normal.

The first observed discharge of ascospores occurred on March 30 at Marionville, Missouri, followed by subsequent discharges on April 5, 6, 7, and 8. At Fayetteville, Arkansas, the first observed discharge occurred April 3 and fourteen different discharge periods were observed from then until May 16. The majority of the ascospores appeared to be discharged during the period April 10 to April 25, although the number of ascospores on the slides in the spore traps indicated a heavy discharge as late as May 4.

Scab lesions on non-sprayed Ben Davis foliage were first observed April 16 at Marionville, Missouri, and on Yellow Transparent foliage at Fayetteville, Arkansas, on April 13. On non-sprayed trees the disease was so severe that all of the first formed leaves had been destroyed by May 7. This complete destruction of the foliage was observed only in the experimental plots where the sprays had purposely been omitted from the check plots. Very extensive foliage injury, however, was visible in many commercial orchards where the growers had neglected to apply the cluster-bud and calyx spray applications at the proper time. There was, in fact, a rather widespread feeling among the growers that the drought of 1934 had practically eliminated the scab fungus, and poorly timed or indifferent spraying was the rule rather than the exception in the early part of 1935.

Lesions on the fruit were first observed at Marionville, Missouri, on May 3 while at Fayetteville, Arkansas, Red Delicious and Golden Delicious fruit were found to have very small lesions on them on April 27.

One of the interesting features of the 1935 outbreak was the prevalence of pedicel infection, a feature that usually is not common in the Ozark section. In some instances as many as 60 per cent of the drops showed pedicel infections.

The environmental conditions, as mentioned in the beginning of this discussion, were extremely favorable to the development and subsequent spread of the scab fungus the months of April and May. The frequent rain storms made commercial spraying operations difficult and the disease in the majority of the orchards caused severe foliage injury and lowered the grade of the fruit crop. The environmental conditions, of course, were the major factor in the 1935 outbreak of the disease, but many growers started the season with the idea, as already mentioned, that the scab fungus would be of minor importance and they omitted the cluster-bud spray application. The cluster-bud and calyx sprays were extremely important applications this year and almost without exception the best commercial control of scab was obtained where spraying was carried on continuously from the time of the cluster-bud spray until the trees were in full bloom.

In some orchards the crops were abandoned as the result of failure to control scab through the omission of the early sprays. The season was so extremely favorable to the disease that it can be safely said that no varieties were resistant to the disease; even varieties such as Jonathan, Yellow Transparent, and the very resistant Grimes Golden were severely affected.

Apple blotch (Phyllosticta solitaria): In the Marionville, Missouri, area, leaf and fruit infections of the apple blotch disease were somewhat more prevalent than in 1934 but the disease was of no commercial importance this season. In Arkansas apple blotch likewise did not become a serious factor although lesions on the fruit were more numerous than they have been for several years. Mature spores were present in the pycnidia as early as February 16 but the cool weather of April and May presumably prevented the fungus getting an early start this season and lesions on the fruit were not observed until June 27.

Apple Bitter Rot (Glomerella cingulata): After a period of seven years absence, this disease appeared in several orchards in the Marionville, Missouri, district in 1932 and again in 1933. During 1934 and 1935, however, it assumed no commercial importance though it was seen on such varieties as Willow Twig and Huntsman in a few scattered orchards in 1935.

Although a few specimens were seen, the disease likewise was of no commercial importance in the Fayetteville, Arkansas section.

Pear Leaf Spot (Fabraea maculata): This disease was very prevalent throughout the entire southern half of Missouri in 1935, particularly on the pear varieties Kieffer and Garber. Infection was first observed on May 1 in our experimental plots and had become general on unsprayed trees by June 1. Fruit was generally infected by this date. Defoliation was complete in the unsprayed plots and in unsprayed commercial orchards by August 1. It is estimated that the loss this season was from 25 to 50 per cent of the fruit. The disease was observed on the fruit and leaves of the Campas #2 pear variety at the University of Arkansas farm.

Cherry Leaf Spot (Coccomyces hiemalis): This disease also assumed a role of unusual importance this year as the result of the very favorable environmental conditions. In Arkansas spots appeared on the leaves as early as May 4 and by May 25 susceptible varieties such as English Morello and Wragg were completely defoliated. Commercial plantings of Montmorency and Early Richmond suffered extensive defoliation and the size of individual cherries, as well as their quality, was adversely affected. The fungus, in a few instances, directly attacked the fruit, producing lesions

which rendered the fruit unfit for sale. One grower near Bentonville, Arkansas, who had given his Early Richmond trees only indifferent spraying, had an appreciable portion of his crop develop lesions on the fruit in addition to the defoliation of the trees. In Missouri this disease was so severe in some commercial plantings of Montmorency and Early Richmond cherries that complete defoliation had occurred before the cherries were ripe. Much of this fruit was naturally not marketable.

Peach Leaf Curl (Taphrina deformans): This disease was exceptionally prevalent in 1935. In the majority of cases the fungus produced a serious defoliation. Fruit infections were prevalent and in some instances practically the entire crop of individual trees was affected with the disease.

Apple Cedar Rust (Gymnosporangium juniperi-virginianae): This fungus was likewise favored by the excessive rainfall in April and May. Lesions on the leaves were collected as early as May 4 at Fayetteville, Arkansas, on the variety Oliver. Leaves of the Red Delicious variety were collected late in July showing 75 to 100 aecia scattered over the lower surface of the individual leaves. Specimens of the disease on the fruit were perhaps a little more common than usual but on the whole the disease assumed no commercial importance as far as the fruit was concerned.

Late in September specimens were received from a large nursery at Farmington, Arkansas, showing cedar rust lesions on the trunks and occasionally on the branches of apple nursery stock. The variety Early Red Bird was the only one affected to an appreciable extent. An interesting feature of the specimens was the presence of very active black rot (Physalospora obtusa) cankers surrounding each rust lesion. Cedar rust lesions on apple nursery stock have not been common in this section since 1926.

Stem Canker of Peach Seedlings (Phytophthora cactorum): This disease, which has not been observed since 1930, reappeared in the nurseries near Rogers, Arkansas, in an aggravated form in 1935. In addition to destroying an appreciable number of seedlings, the fungus also attacked budded trees. Cankers formed on the succulent growth developing from buds inserted the fall of 1934, and one nurseryman estimated that 20 per cent of his budded peach stock was affected. The disease also appeared on budded plum stock and in a few cases budded apple stock was affected.

Spray Injury in 1935: The past season presented the most favorable conditions in several years for the occurrence of spray injury, particularly from fungicides containing copper. In the months of April, May, and the first half of June, the temperatures were below the normal. Rainfall during May and in early June was

above the normal. A large percentage of the days during these periods were cloudy. Spraying operations under such conditions were very difficult, particularly in those orchards where from four to six days were often required to complete a spray.

Because of the prevalence of scab, most orchardists continued the use of liquid lime sulphur until the last of May. During the first week of June, Bordeaux mixture was substituted for liquid lime sulphur in most commercial spray schedules.

Inasmuch as the first blotch spray was due to be applied at this time and since scab was under control in well sprayed orchards, this seemed to be the proper procedure to follow. It also seemed best to discontinue the use of lime sulphur because of the danger of spray injury in case of a rapid rise in temperatures. In nine seasons out of ten, this schedule would have very likely been satisfactory but in 1935 it did not prove to be so.

What actually occurred in many commercial orchards observed during this period was that due to the environmental factors mentioned before, viz., rainfall with consequent high humidity and low temperatures, the Bordeaux mixture often remained on foliage and fruit from 6 to 8 hours before drying. (Cooperative work between the Bureau of Plant Industry and the Missouri and Arkansas Agricultural Experiment Stations).

APPLE DISEASES IN PENNSYLVANIA IN 1935

R. S. Kirby, G. L. Zundel, L. T. Denniston, and A. Bauer.

Table 1. Summary of apple disease survey in Pennsylvania, 1935.

Treatments or sprays	Number orchards surveyed	Number apples counted	Percentage of diseased apples								
			Scab	Brooks spot	Sooty blotch	Blotch	Black rot	Bitter rot	Rust G. j. vir.	Rust G. Germinale	Total
All sprays applied as recommended	93	46,485	1.7	.01	.25	t	t	t	t	t	2.25
Part sprayed	247	95,666	14.37	1.5	4.19	.007	.05	.19	.05	.001	20.4
Unsprayed	46	4,225	94.01	9.5	46.6	1.1	1.2	.11	.05	t	100.
All sprays but incorrect application	25	6,275	15.8	2.8	4.3	.02	.02		.02	.02	23.2
All sprays but incorrect timing	9	3,200	17.1	.6	.2				.2		17.6
All sprays but one - spray omitted											
Delayed dormant	18	7,070	14.2	.3	.8	.3	.3	2.3	.07	.03	22.8
Pre-pink	23	9,053	8.35	1.1	1.7		.01		.01		11.1
Pink	23	7,190	16.7	3.	3.2	.04	.097	.11	.19		23.5
Petal fall	4	1,280	7.7	1.7	2.5		.07		.07		12.6
1st summer	5	950	28.	2.1	2.4						33.
2d summer	4	1,400	7.6	2.8	3.2	.07					13.6
3d summer	10	2,800	8.5	.3	.03						8.8
4th summer	25	8,773	7.9	1.2	6.1	.05	.05		.14		15.6

(Agricultural Experiment Station, Pennsylvania State College)

BARLEY DISEASE SURVEY DURING THE SEASON OF 1935

James G. Dickson, and G. A. Wiebe, Division of Cereal Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture, cooperating with the Wisconsin Agricultural Experiment Station, R. H. Black and J. J. Christensen assisting in Minnesota, L. C. Burnett and C. R. Reddy assisting in Iowa, H. H. Flor and W. E. Brentzel assisting in North Dakota, H. L. Shands and D. Bowman assisting in Wisconsin.

The barley disease survey in 1935 was planned to cover the more important barley areas in the Upper Mississippi Valley which are furnishing malting barley to the principal terminal markets. The southern half of Wisconsin as well as the eastern and northwestern parts of the State were included. The northwestern part of Illinois was surveyed only superficially as barley acreage in the State was relatively low due to the chinch bug damage the previous year. The northern half of Iowa, especially the northcentral and northwestern parts, was surveyed. A general trip was made through the southeastern part of South Dakota. The southern half of Minnesota was surveyed rather intensively and a general survey was made through the western part of the State into the Red River Valley. The barley areas in North Dakota were covered by Flor and Brentzel.

Survey notes were taken on the important diseases present, the general crop sequence and cultural methods, the variety of barley and relative amount of mixtures of other varieties and grains, and the general condition of the crop. The detailed tables for each of the fields inspected are not included in the report although copies can be provided to those interested. Isolations from the scabbed and blighted heads collected are being made at Madison and will be compared with the isolations made from samples of barley sent in by the Federal Grain Division when the crop moves to market later in the season.

The present summary report includes average disease percentages found in the various general or local areas, the varieties of barley found, the average percentage of mixtures of other varieties of barley and other grains, and the general condition of the crop.

Diseases found in the 1935 crop

Barley Scab: The presence of barley scab (Gibberella saubinetii) over rather extensive areas in the States of Illinois, Wisconsin, Iowa, and Minnesota will reduce materially the supply of malting barley available from the 1935 crop. In many local areas the scab is sufficiently severe to cause damage in feeding the crop to hogs. In most of the infected sections with the possible exception of locations in Iowa and Minnesota there is a wide variation in

scab damage from field to field which difference will not be shown in the averages given in the following tables. Emphasis should be placed on keeping the scab damaged barley separate from sound barley to prevent further reduction in quality through mixing.

Perithecial development on corn stalks and barley straw and stubble was unusually heavy throughout most of the areas surveyed. Gibberella perithecia were found on crop refuse as far north as Manitowoc, Appleton, and Ellsworth in Wisconsin and Fergus Falls in Minnesota. The presence of perithecia on crop refuse showed an influence on scab development in Wisconsin and parts of Minnesota. Inoculum was so abundant in many sections especially in Illinois, Iowa, and southwestern Minnesota that no influence of crop sequence on scab development was evident. Barley on soy bean and sugar beet land was as severely damaged by scab in these sections as barley on disked or poorly plowed corn land. The data on blight infection are given in table 2. The estimated general infection by blight is shown in figure 1. No attempt was made to differentiate between scab and blight in the field survey although the tentative summary table on the platings shows the relative presence of the causal organisms in these general sections. See table 3.

Table 2. Showing the average percentage scab and blight combined, smuts, and stripe in the barley varieties in the several areas within the States of Wisconsin, Illinois, Iowa, South Dakota, and Minnesota. Averages taken from the field survey data of 1935.

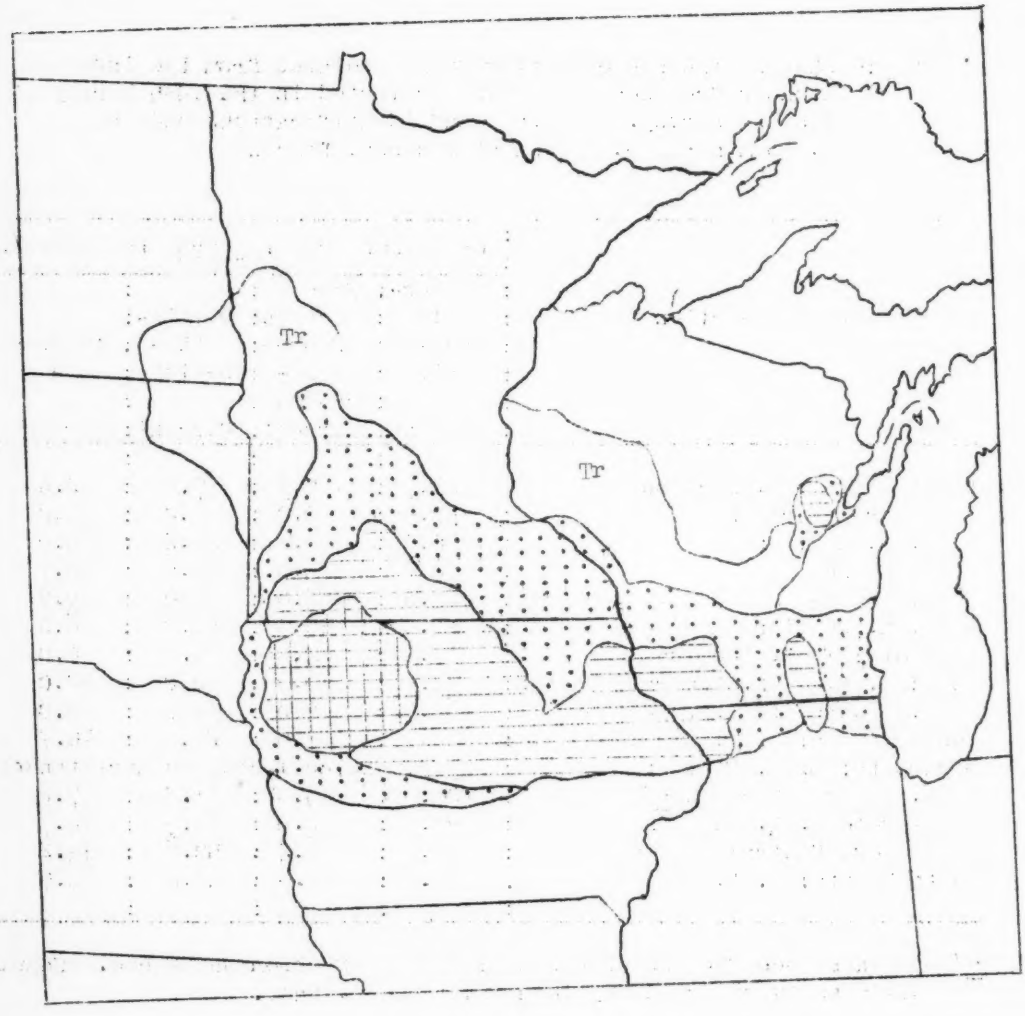
State, location within State	Fields inspected	Scab and blight: Average heads infected	Scab and blight: Average amount of head infected-4	Average smutted heads	Average striped plants	Barley varieties present in areas: Oderbrucker Manchuria	Pedigree 38	Velvet	Glabron
	Number	Percent		Percent	Percent	Percent	Percent	Percent	Percent
Wisconsin: S. W. Section	20	56	1	3.0	1.8	25	50	25	0
Central Section	22	33	t	3.3	0.6	14	68	18	0
S.E. Section	44	7	t	2.8	0.6	36	39	18	7a/
N.E. Section	23	t	t	3.0	1.5	35	39	22	4a/
N. Central Section	11	14	t	4.1	0.1	36	64	0	0
N.W. Section	5	13	t	0.8	t	0	60	40	0
Illinois: N. W. Section	3	37	1	3.3	0.3	0	33	67	0
Iowa: S. E. to S. Central Section	5	63	1	0.8	t	0	20	20	60
N. Central to N. W. Section	20	78	1+	0.2	0.3	20	20	70	0
South Dakota: S. E. Section	13b/	7	t	0.2	0.8	38b/	8	23	23
Minnesota: S. E. Section	19	38	1-	-	-	16c/		84c/	
S. Central Section	72	53	1	0.4	0.2	34c/	2	61c/	2
Extreme S. W. Section	4	7	t	1.5	0.5	50	0	25	25
Western Central Section	31d/	14	t	1.2	0.6	39	6	42	6
North Dakota: S. E. Section	5	42	t	-	-	-	-	-	-

a/ Two-rowed and mixed lots instead of Glabron.
b/ Two fields of Odessa classed with Manchuria totals.
c/ Fields inspected by Black and Christensen were recorded smooth or rough and have been classed into the Velvet and Manchuria percentages.
d/ Trebi 7 per cent makes up the additional varieties inspected in this area.

Table 3: Showing the predominating fungi isolated from the infected kernels from head specimens collected in the 1935 barley disease survey. Platings and identifications made by D. Bowman and H. Johann at Madison, Wisconsin.

State and section	Organisms isolated from the infected kernels			
	Gibberella saubinetii	Fusaria section Sporotrichoides	Helminthosporium	Alternaria
	Percent	Percent	Percent	Percent
Wisconsin: S. W. Section	48.7	5.3	7.3	4.0
Central Section	62.5	9.0	7.0	3.0
S. E. Section	20.0	14.3	21.4	5.0
N. E. Section	0.0	45.0	6.5	0.7
N. Central Section	25.0	34.0	9.0	5.0
N. W. Section	10.0	18.0	52.0	8.0
Illinois: N. W. Section	82.0	4.0	6.0	0.0
Iowa: S. E. to S. Central Section	84.0	10.0	0.0	0.0
N. Central to N.W. Section	80.5	0.0	11.0	3.0
South Dakota: S. E. Section	41.1	1.0	21.1	16.7
Minnesota: S. E. Section	Specimens collected by Christensen			
S. Central Section a/	42.2	5.0	11.7	7.2
Extreme S. W. Section	63.3	0.0	18.3	6.7
Western Central Section	20.4	8.4	50.8	19.2
North Dakota: S. E. Section	16.0	2.0	54.0	8.0

a/ Platings made from specimens collected by Dickson and Wiebe. Samples collected by other survey team taken to St. Paul.



Infection generally severe with grain damaged.

Infection varying from field to field many showing considerable damage.

Infection general but limited to one to few spikelets per head in most fields.

Fig. 1. Estimates of blight damage in barley for 1935, based on field survey made during July.

Smuts: Relatively few fields were found free from smut. Infections were found to range from a trace to 20 per cent in one field of Oderbrucker near Elkhorn, Wisconsin. The average smut infection was about 3 per cent. The loose smut types were much more prevalent in all of the areas excepting the Western Minnesota section where considerable covered smut (Ustilago hordei) was found in the fields of Manchuria barley. The average smut infection for each section is given in table 2.

Stripe: Barley stripe (Helminthosporium gramineum) was found in most fields of Oderbrucker, Manchuria, Velvet, and Odessa barley although the percentages were relatively low in contrast with average years. See table 2. The relatively dry season of 1934 probably accounts in large part for the low stripe infection. Sufficient plants were found in most fields to supply inoculum for floral infection. Weather conditions in general were favorable for infection which probably will result in heavier losses from the stripe disease in 1936. The stripe resistance of Wisconsin Pedigree 38 and Minnesota Glabron was very evident in all fields of these two varieties.

Rusts: Leaf rust was prevalent on barley throughout the area surveyed. In some fields infections were quite severe. The barley leaf rust caused by Puccinia anomala was present in limited amounts. Most of the leaf rust was the brown leaf rust, probably the leaf rust of wheat (P. triticina = P. rubigo-vera triticii) which was unusually severe on barley during the present season.

Stem rust (P. graminis) on barley was generally prevalent through Iowa, South Dakota, North Dakota, and Minnesota. All fields were infected; late sown barley was heavily infected. Relatively heavy damage will result in the more northern sections, especially the Red River Valley. Pedigree 38 was relatively free from stem rust throughout this area.

Varieties of barley found through the area

While the number of fields inspected during the survey are not sufficient to give an accurate distribution of the varieties of barley grown in the Upper Mississippi Valley, the figures are submitted as of general interest. The percentage of Pedigree 38 in Wisconsin is somewhat lower than in the previous two years' determinations. The Oderbrucker and Velvet percentages have both increased sufficiently to balance the reduction in Pedigree 38. The Minnesota figures show that Velvet is probably the predominating variety in the State with Manchuria second in importance. The number of fields of Trebi found in the area was seemingly lower than for the past two or three years. The distribution of the barley varieties by States is shown in table 4.

Table 4. Showing varieties of barley found in the 1935 field survey

State	Varieties of barley found in field inspection														Total number
	Oderbrucker		Manchuria		Pedigree 38		Velvet		Glabron		Miscellaneous				
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent			
Wisconsin	35	27.8	0	0	61	48.4	27	21.4	0	0	3	2.4			126
Illinois	0		0		1	33.3	2	66.7	0		0				3
Iowa	-		4	16.0	3	12.0	15	60.0	3	12.0	0				25
South Dakota	3a/	23.0a/	3	23.0	1	7.7	3	23.0	2	15.4	1b/	7.7			13
Minnesota	0		15	30.6	3	6.1	24	49.0	5	10.2	2b/	4.1			49

a/ The 3 fields of Odessa were placed in this column.

b/ Three fields of Trebi.

Mixtures of barley varieties and other grains

Detailed counts on mixtures of barley varieties and other grains were taken only in Wisconsin fields. The averages obtained in Wisconsin should apply fairly well in Minnesota especially the southern half of the State.

The mixture of two-rowed barley in Oderbrucker and Manchuria was rather generally prevalent in Wisconsin and Minnesota. There was an average of 1.1 per cent mixture of two-rowed barley in the Oderbrucker variety in Wisconsin. In contrast there were only a few fields of Pedigree 38 containing mixtures of two-rowed barley. These few fields of mixed Pedigree 38 were also badly mixed with Oderbrucker which probably accounts for the presence of the two-rowed variety. There was an average of 1.0 per cent mixture of smooth-awned barley (Pedigree 38 and Velvet) in the fields of Oderbrucker and 0.8 per cent Oderbrucker in the fields of Velvet and Pedigree 38 inspected in Wisconsin.

Mixtures of oats in barley were not as prevalent in Wisconsin as in Iowa or Minnesota. In Wisconsin there was an average of 1.5 per cent oats in the Oderbrucker fields and 0.3 per cent in the fields of Pedigree 38 and Velvet inspected. The percentage of oats in Iowa barley fields was much higher than these figures.

The field survey demonstrated the need of new seed stocks in most of the malting barley area. New seed lots free from mixtures should be produced by the experiment stations and distributed to seed producers. The continuation of the educational program on barley quality among the farmers should help in reducing such mixtures. New seed stocks especially of the Oderbrucker and Manchuria varieties are urgently needed to reduce the mixtures of two-rowed barleys.

General condition of the barley crop

The maturity of the barley crop throughout most of the area was hastened by the hot, relatively dry weather during the middle of July. In some areas the rapid maturity resulted in damage from shrivelling and premature ripening. Kernel size and general quality were affected to some degree over most of the area. In general, however, the crop will be of good kernel size and mellow in texture. Farmers through most of the area, especially where blight and stem rust had not caused severe damage, were allowing the barley to reach full maturity before cutting.

PEA DISEASES IN CALIFORNIA IN 1935

William C. Snyder

Those diseases largely dependent upon rain for their occurrence and spread, such as the foliage and pod blights, were especially evident in the 1935 spring pea (Pisum sativum L.) crops in California. As is usual, these disappeared with the approach of the dry season and were replaced more or less by virus troubles, powdery mildew, wilts and root rots in the summer peas. In the fall crop virus diseases were accompanied by mildew and scab where plantings were not eliminated by frost. Observations were made upon peas grown for fresh market in the coastal counties extending from Mendocino to Santa Barbara County.

Ascochyta blight. The three diseases known as Mycosphaerella blight, Ascochyta foot rot, and Ascochyta leaf and pod spot, caused respectively by Mycosphaerella pinodes (Berk. & Blox.) Stone, Ascochyta pinodella Jones, and Ascochyta pisi Lib. accounted for serious damage to spring (end of January, February, March, and April) peas in San Luis Obispo, Santa Clara, and Alameda counties, and caused varying amounts of loss in other coastal counties, occurring later in more northerly districts. Some fields were a total loss. Although all three organisms were frequently isolated from the same field, M. pinodes appeared to be the most widespread and abundant.

Leaf blotch. In early to late spring a leaf blotch was general, but usually not serious, on peas from Mendocino to Monterey County. The organism was identified as Septoria pisi West. Infection was noted in San Luis Obispo County the end of January, in Alameda, Monterey, and Santa Clara Counties, February and March, and in San Mateo and Mendocino Counties in June.

Cladosporium spot. Foliage spot and pod scab caused by Cladosporium pisicola Snyder was found on early spring and late fall peas grown near the coast. It was present in San Luis Obispo County in January and August, in Alameda County in February, and in Monterey and Santa Clara Counties in October.

Downy mildew. Peronospora viciae (Berk.) De Bary was widespread in the spring crop, but did not cause serious damage except for the small proportion of systemically infected plants which were killed. Pod infection was common in infested fields. The writer also observed a few instances under moist conditions where pods in the field bore conidia on the surface of the infected tissue. One notable instance was a field in Monterey County in April where the plants were surrounded by weeds. Such sporulation had been obtained in greenhouse experiments, but had not been seen in the field before. The disease was seen in February, March, and April in San Luis Obispo, Monterey,

Santa Clara, and Alameda Counties, and in June in Mendocino and San Mateo Counties.

Powdery mildew. This disease, caused by Erysiphe polygoni DC., appeared in spring and summer plantings where the fungus was not held in check by sulfur dust. In San Luis Obispo County it was observed in March and April, in Sacramento and San Joaquin Counties in May, and in Alameda County in the summer.

Wilt. Fusarium wilt, caused by F. orthoceras App. & Wr. var. pisi Linford, continues to appear, since its discovery in this State in 1932, with the usual severity characteristic of it, resulting in complete loss where susceptible peas (Laxton's Progress) were grown on infested soil in San Luis Obispo County. The area infested by this organism, however, is still very limited. Wilt symptoms were well advanced in March.

Near-Wilt. Although it is perhaps a little more widespread in California than wilt, near-wilt caused by F. oxysporum Schl. f.8 Snyder has only appeared in serious form on a few fields in San Luis Obispo County. Susceptible peas grown on these badly infested fields generally do not produce a crop. Here, as with wilt, the Laxton's Progress variety is susceptible although the plants are not killed as quickly as when infected with wilt. Symptoms, however, were well defined in San Luis Obispo County by the end of March.

Root rot. A scattering of Fusarium root rot, caused by F. solani (Mart.) App. and Wr. var. martii (App. & Wr.) Wr. f. 2 Snyder, was encountered in plantings of peas subjected to high summer temperatures such as occur in the interior valleys. The fungus was isolated in September from diseased plants grown in Santa Clara and Tulare Counties.

Rust. In June a rust on peas was observed in California for the first time in the writer's experience on a small planting in Mendocino County. Infection was not abundant, and was confined largely to the lower leaves. The fungus was identified as Uromyces fabae (Pers.) De Bary from the occasional hypophyllous aecia and frequent amphigenous uredinia on infected leaves. U. fabae was present in the same field on broad bean, Vicia faba var. minor and also on Lathyrus vestitus growing wild at the edges of the field. That the rust on pea is at least a form physiologically distinct from that on broad bean is indicated by the observation that although rust of broad beans is common on plants in or bordering pea fields, the rust on pea has not been observed before.

Stem rot. A stem rot was occasionally encountered in late spring from which Sclerotinia sclerotiorum (Lib.) Mass. was isolated. Where present (San Benito County, April) the disease stood out as

scattered, dying plants, in or on the stems of which sclerotia of the fungus could frequently be seen.

Bacterial blight. The occurrence of bacterial blight, caused by Bacterium pisi Sackett, was slight. The disease was seen in early spring (February and March, in San Luis Obispo and Alameda Counties), but did not prove serious.

Frost damage. In both early spring and late fall considerable damage was done by frost in the coastal counties either by destroying developing blossoms or plant itself, or by causing whitish blisters on the green pods. In more severe cases blistering of the ovules occurred also.

Virus diseases. Mosaic has appeared in more or less severe form on peas in most districts throughout the entire growing season. Loss has been due to stunted vine growth, reduced yield, and a reduced salability of the pods owing to pod deformation. The same disease (or diseases) has caused difficulties in growing sweet peas, and some loss in greenhouse culture through "breaking" of the flowers. The streak type of virus disease also has been observed frequently during the season on both garden pea and sweet pea, usually in a destructive form and sometimes in combination with mosaic.

In San Luis Obispo County diseased plants were found in January and by March the virus diseases were general. They were also prevalent in the summer and fall pole peas there. In Alameda and Santa Clara Counties the virus diseases appeared in February and became general and frequently severe in April and May. In May they were also present in Sacramento and San Joaquin Counties; and in Monterey County where both spring and fall peas are grown, pea viruses were general in April and also October. (Division of Plant Pathology, University of California).

CURRENT REPORTS ON VEGETABLE DISEASES IN SOUTHERN STATES

POTATO DISEASES IN FLORIDA: Rhizoctonia disease (Corticium vagum B & C) is causing considerable retardation in germination and some reduction in stand in potato fields in the vicinity of Homestead, Florida, this season. The disease is especially severe on potatoes planted in late November and early December. The young sprouts are attacked and rotted away just below the surface of the ground, and in many cases, later crops of sprouts are attacked successively, so that missing hills result. Very few of the fields examined were found to be free of the trouble, and in some fields from 25 to 30 per cent of the plants were affected. The unusual severity of the disease this season in the Homestead section is believed to be the

result of the abnormally cool weather experienced during December, which favored the growth of the organism while retarding the growth of the potatoes.

Virus diseases of potatoes are prevalent quite generally in the Homestead area. Infections range from 1 per cent to as much as 75 per cent, with average about 10 to 15 per cent. The prevailing types of virus troubles are mosaic and rugose. In older plantings these diseases are causing a premature death of plants infected, causing some reduction in yields. (George D. Ruehle and Stacy O. Hawkins, Jan. 7).

CABBAGE DISEASES IN SOUTH CAROLINA: For the first time, I have found two severe cases of yellows (Fusarium conglutinans) in the Charleston section. One field of about three acres has suffered a loss of about 75 per cent. Another of about six acres will show a loss of 25 per cent. Other reports have been made of similar trouble but these have not been verified. Some growers are confusing the disease yellows with a yellowing of the plants which is caused by a magnesium or manganese deficiency. The full extent of the present disease outbreak can not be determined without a careful survey of this area; however, with the present method of planting cabbage after cabbage on the same land, the local growers are facing a rather serious condition with respect to this crop.

Downy mildew (Peronospora parasitica) has been rather serious over the entire Charleston area during the past two months, particularly in the seed beds. In practically all cases there was a 100 per cent infection of the young plants in the beds. In some cases there was a 50 per cent loss of plants. Where plants were not killed outright, they were stunted in growth and, in many cases, rendered unfit for setting in the fields.

Several cases of black-leg (Phoma lingam) infection have been found in the Charleston area during the past several weeks. One field of three acres showed a loss of about 10 per cent from the trouble but all others were infections of a few individual plants. (W. D. Moore, Dec. 20).

OBSERVATIONS ON STRAWBERRY DWARF IN NORTH CAROLINA

G. A. Meckstroth

The dwarf disease or crimp of strawberry, caused by the nematode Aphelenchoides fragariae, is distributed generally throughout the strawberry growing section of North Carolina, and the annual loss sustained due to dying of infested plants is possibly about 5 per cent. Of far greater importance is the weakening of surviving

plants, which produce few runners and are not vigorous when fruit-bud formation begins in the fall. Some observations made show that the planting of diseased plants is a very important factor in the initiation of infestation in any particular field. In the Chadbourn, North Carolina, area it has become a common practice for growers to purchase plants from other States, mainly Arkansas and Tennessee, for setting out new fields in February and March. These plants presumably come from fields which have been inspected by the State nursery inspectors and the growers have reason to believe that they are getting dwarf-free plants. From observations made by the writer during the past few years of some fields planted with Arkansas and Tennessee shipments, it is evident that such plants have sometimes been a very fertile source of infestation.

A comparison of these fields with some planted with the grower's own stock indicates that in many cases better results were obtained with plants taken from their own fields. This occurrence of diseased plants in inspected material is causing growers to lose faith in the nursery and plant inspection service in force at present, and raises a question as to the adequacy of our present system of strawberry plant inspection. It is possible that this may in part be explained by the fact that some inspections are made in response to belated requests in early spring, at which time diseased plants cannot always be detected, as the typical dwarf or crimp symptoms as they appear during the summer are not so evident. In North Carolina typical symptoms begin to appear from about the first to the middle of June, become more marked and persist during the summer months, and with the advent of cold weather in late fall these characteristic symptoms become less pronounced. From this it is evident that plant inspection at any time other than the summer and early fall months is inadequate.

It appears, from replies received from plant inspectors in Arkansas and Tennessee, that the inspection for dwarf is made from August to April. Probably these inspections should be made only during the summer and early fall months.

To present more clearly the need of North Carolina strawberry growers to exercise more care in selection of plants for field planting in reference to dwarf, a few specific observations will be cited. One grower who purchased plants from Arkansas in 1935 later discovered a large percentage of his plants showing dwarf symptoms. He rogued his field with the exception of three rows. By actual count of the plants in the three unrogued rows by the writer on July 25, it was found that 22 per cent of those plants showed dwarf symptoms. Assuming that the entire field originally was uniformly infested, it is evident that the grower sustained a heavy loss of plants. In another field inspected on the same date, planted with Tennessee-grown plants, it was found that 64 per cent of them showed definite

symptoms of dwarf. It is believed that this is a clear case of introducing the nematodes on the plants from the nursery, as it was a newly set field planted on recently cleared ground where strawberries had not previously been grown. Since there were no old strawberry fields bordering this one where the count was made, there was no possible chance of the nematodes being carried into it by surface water.

It is interesting to note that these plants came from the same section of Tennessee as a lot shipped to Chadbourn in March, 1933, of which 41 per cent of the plants developed dwarf symptoms within four months after setting.

During the spring of 1934, in an effort to secure dwarf-free plants, the Chadbourn Marketing Company and some growers had plants shipped from a nursery in southern Illinois, in a region from which the disease has not yet been reported. Several of these fields set with the Illinois-grown plants were inspected later during that summer, and it was found that all fields were free of dwarf except one two-acre field in which six infected plants were noted. During August of the following year this field was again inspected to determine the spread in the rows where diseased plants were found the previous year. Some plants with definite dwarf symptoms were found in these rows and several plants at some distance in other rows. They were, however, nearly all confined to a low portion of the field, where surface water could have carried the nematodes from the original plants showing dwarf.

Counts were also made on July 19, 1934 in a field set in March with plants from three different sources, namely, Arkansas, Tennessee, and Illinois, with results as follows: Of the Tennessee and Arkansas plants, 11.9 per cent and 4.1 per cent respectively showed symptoms of dwarf, while none of the plants from Illinois showed signs of the disease. The Illinois-grown plants were still free of dwarf when this field was again carefully inspected in September.

It is the writer's opinion that the growers themselves can very largely or entirely remedy this serious strawberry dwarf situation in North Carolina by either one of two means or by a combination of the two. It is well known that the nematode which causes strawberry dwarf has not become established in the more northern strawberry regions, and plants grown in Maryland, Delaware, Pennsylvania, Ohio, Indiana, Illinois, and States to the north of these are free or relatively free of the dwarf organism. Therefore it will be advantageous to the growers if they purchase plants only from regions known to be free of dwarf. The alternative means of lessening the dwarf losses would be for the growers to produce their own plants by starting with disease-free northern stock, planted on

some high, isolated portion of their farms, preferably newly cleared land and not bordering other strawberry fields, thus eliminating the possibility of infesting the nursery plot by contaminated surface water. These growers' nursery plots should be inspected frequently, especially during the first growing season, and if practicable with the assistance of the County Agent, and all weak or abnormal plants which develop or those showing stunted or yellowish leaves should be promptly taken out of the field as detected. (Division of Fruit and Vegetable Crops and Diseases).

NEMATODES ON ALLIGATOR WEED

A. G. Plakidas

Recently (December 8, 1935) plants of Alternanthera phylloxeroides, known locally as alligator weed, which were growing in a strawberry field in the vicinity of Ponchatoula, Louisiana, were found heavily infested with the root-knot nematode, Heterodera marioni. Dr. G. Steiner, Office of Nematology, Bureau of Plant Industry, U. S. Department of Agriculture, to whom specimens were sent, made the determination. In addition to the root-knot nematode, Dr. Steiner found the leaves of the plant infested slightly with Anguillulina dihystera Cobb.

The finding of root-knot infestation on alligator weed, aside from being of interest in that this plant is a previously unreported host of this nematode, has an important economic significance. This week is gradually, but steadily, invading the cultivated fields in the strawberry-growing section of the State and becoming a serious pest. Its underground stems remain viable for a long time. As even a small piece of the stem will grow, it is practically impossible to eradicate this weed once it becomes established in a field. If it becomes infested with nematodes, it will serve as a permanent source of infection for strawberries and other susceptible plants. (Louisiana Agricultural Experiment Station).

MACROSPORIUM ON LILAC

Thelma B. Post

Macrosporium commune Rbh. was isolated from spots on Syringa vulgaris leaves collected in Chevy Chase, Maryland, in October, 1934. This spotting appeared to be prevalent on lilacs at that time. Specimens were also collected at Willard, North Carolina. Infection of the specimens by mildew, Phytophthora, bacteria or other parasites was not observed and was not, apparently, a factor. The spots were tan, zonate and circular, becoming irregular by confluence. They

were scattered over the leaf blade. Spores on the leaves appeared to be borne singly, but on agar plates they were borne both singly and in chains. (Division of Fruit and Vegetable Crops and Diseases).